

WHAT IS CLAIMED IS:

1. A process for the manufacture of a railroad rail of a steel alloy having a pearlitic microstructure, which rail has a weight of 30 to 100 kg/m, good long-term serviceability, high ductility and high abrasion resistance of the working surface at a rail head, wherein a rail which has a chemical composition in weight % of

carbon (C)	0.4 to 1.0
silicon (Si)	0.1 to 1.2
manganese (Mn)	0.5 to 3.5
chromium (Cr)	up to 1.5,

optionally other alloy elements below 1 weight %, the rest being iron (Fe) and impurities occurring in the manufacturing process, is shaped, during a last pass of a multiple longitudinal rolling, at a reduction rate of 1.8 to 8% and aligned straight in its longitudinal direction at a temperature between 770 °C and 1050 °C, whereafter the rail is mounted in a vertically suspended position with its head down and is allowed to cool slowly in still air to a temperature of 5 to 120 °C above an Ar₃ temperature at a rate of 3 °C/min, and upon reaching this temperature at least the rail head is dipped, in its entire longitudinal extension, into a cooling liquid and is cooled, within a range between 800 °C and 450 °C, with increased cooling intensity and at a rate of 1.6 to 2.4 °C/s, to a temperature of conversion of an austenitic grain microstructure into a fine pearlitic grain microstructure, followed by lifting the rail out of the cooling liquid, placing it onto a cooling bed and allowing it to cool slowly in still air.

2. The process of claim 1, wherein the process results in a railroad rail comprising a rail head having a portion of fine pearlitic grain microstructure and increased hardness of between 340 HB and 425 HB down to a sufficient depth from a top surface, with the remaining rail portions having a hardness which is lower by more than 10 to 40 HB than that

[illegible]

3. The process of claim 2, wherein a central area at a base of the rail, opposite a web, has a higher hardness than portions in peripheral parts of the base and in the web.
4. The process of claim 2, wherein a hardness in a transition from an upper head portion to a lower head portion and to a web portion decreases continuously.